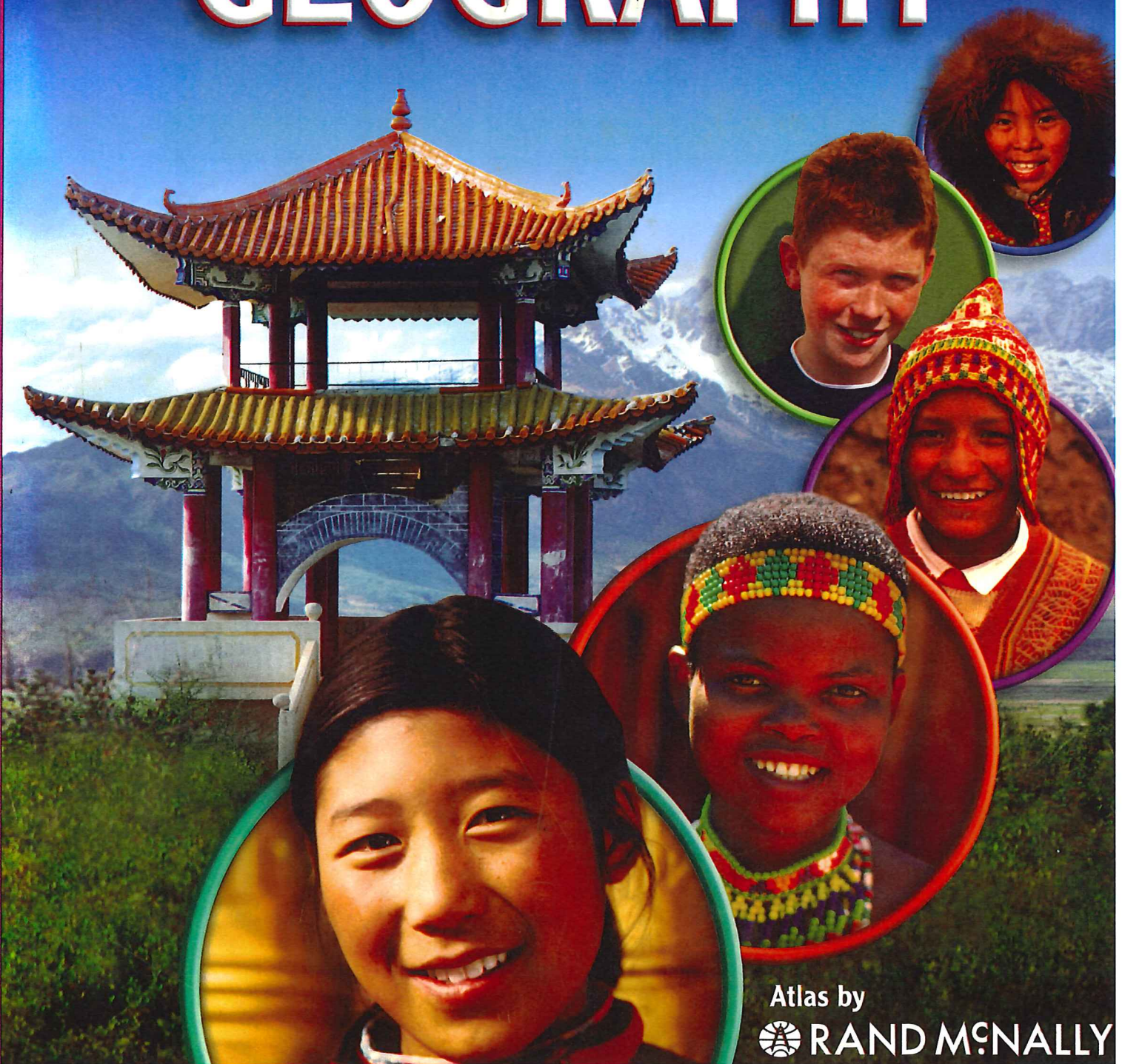


McDougal Littell

World Cultures *and* GEOGRAPHY



Atlas by
 RAND McNALLY

SECTION
4

Reading for Understanding

▶ Key Ideas

BEFORE, YOU LEARNED

Many different physical systems influence the way we live on Earth.

NOW YOU WILL LEARN

Human interference with physical systems can cause problems with the environment.

▶ Vocabulary

TERMS & NAMES

global warming an increase in the average temperature of the Earth's atmosphere

greenhouse effect the trapping of the sun's heat by gases in the Earth's atmosphere

greenhouse gas any gas in the atmosphere that contributes to the greenhouse effect

fossil fuels fuels such as coal, oil, and natural gas

desertification the process in which farmland becomes less productive because the land is degraded

sustainable using natural resources in a way that they exist for future generations

BACKGROUND VOCABULARY

carbon dioxide a gas composed of carbon and oxygen

emissions substances discharged into the air

degraded of lower quality



Visual Vocabulary desertification

▶ Reading Strategy

Re-create the chart shown at right. As you read and respond to the **KEY QUESTIONS**, use the chart to compare and contrast details about environmental challenges the world faces.



Skillbuilder Handbook, page R9

COMPARE AND CONTRAST

GLOBAL WARMING	DESERTIFICATION



Environmental Challenges

Connecting to Your World

Have your parents or other adults ever told you that the climate seems to be changing? Maybe they said something like, "We never had hurricanes or tornados like these when I was a kid." They could be right—climates do change. Some changes take place naturally over many years, such as the build-up of ice during ice ages. But recently, scientists have noticed rapid climate changes that some believe is the result of human activity.

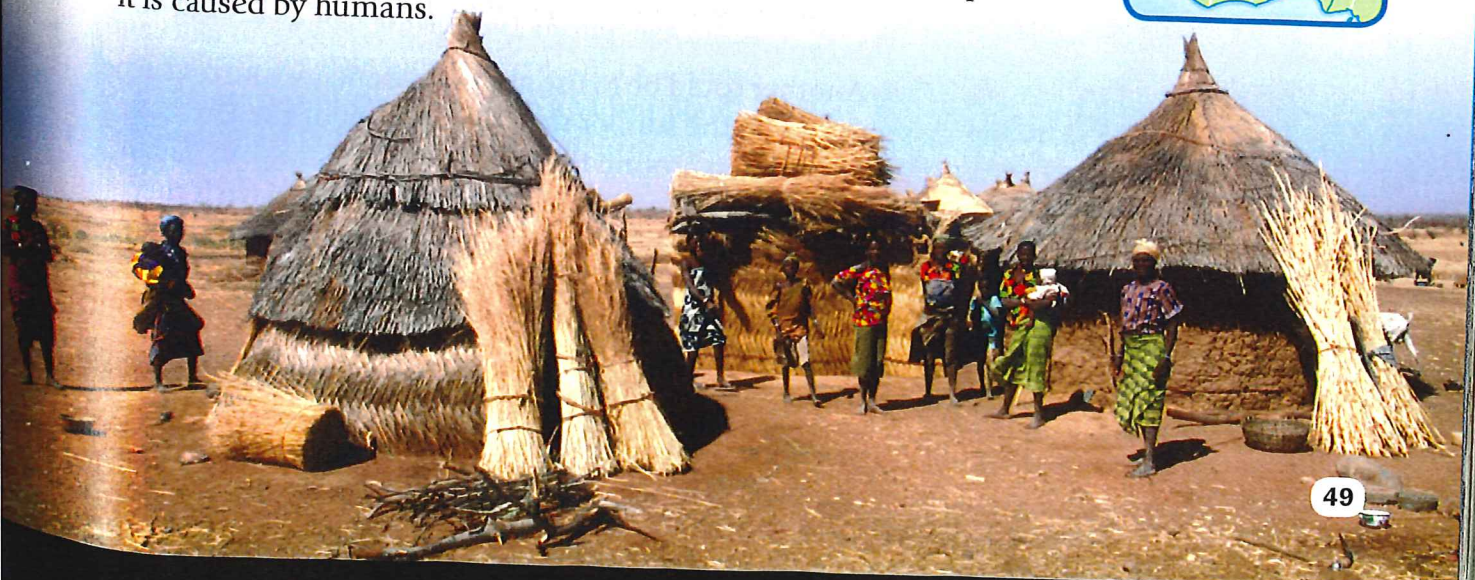
Global Warming

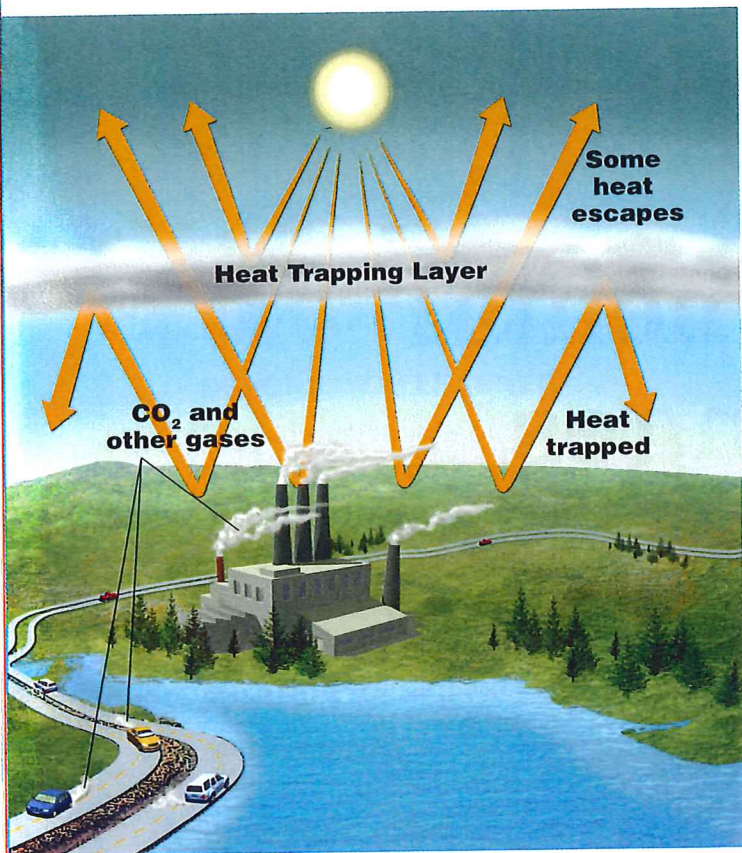
KEY QUESTION How are global warming and the greenhouse effect related?

Global warming and desertification are two possible threats to the environment. **Global warming** is an increase in the average temperature of the Earth's atmosphere. It refers to an increase large enough to cause changes in the Earth's overall climate. The Earth's average temperature has risen between 0.9 and 1.3°F since the late 1800s. Many scientists think that temperatures may rise another 2.5 to 10.4°F by the end of the century. Some scientists believe that this warming is part of the larger cycle of warm and cold periods in the Earth's history. Others suspect that it is caused by humans.

Dori, Burkina Faso

Changes in the climate have caused drought in this region, leading to fewer crops.





Greenhouse Effect

Trapped gases and heat combine to change the Earth's temperature. **How do humans add to the greenhouse effect?**

The Greenhouse Effect The trapping of the sun's heat by gases in the Earth's atmosphere is called the **greenhouse effect**. These gases act like the glass roof of a greenhouse. They let in solar energy, which heats up the planet, but they trap much of the heat that rises from the Earth's surface. So, the Earth becomes warmer. Some greenhouse effect is necessary. Without it, you would be living on a freezing cold planet. The temperature would be about zero degrees Fahrenheit.

Any gas in the atmosphere that contributes to the greenhouse effect is called a **greenhouse gas**. Greenhouse gases include water vapor and **carbon dioxide**, a gas composed of carbon and oxygen. The burning of **fossil fuels**, such as coal, oil, and natural gas, has caused an increase in carbon dioxide in the atmosphere. As this gas builds in the atmosphere, the atmosphere becomes warmer and speeds up the heating effect.

The Impact on the Climate In theory, a more intense greenhouse effect could change the Earth's climate. Warmer temperatures could cause the ice caps and glaciers around the world to melt and sea levels to rise. Flooding could occur along coastal regions. Global land-use patterns would change. Some crops would no longer grow in certain areas. Some areas would become hotter and drier, with extreme heat waves, droughts, and more forest fires. These changes would alter the fragile relationships between living things and the environment.

Solutions Lowering the levels of greenhouse gases is a complex, worldwide goal. Some nations generate huge amounts of greenhouse gases. These gases affect not only those nations, but also the whole planet. So, humans need to take steps to reduce the levels of greenhouse gases. One solution might be to build more energy-efficient cars and factories. Another could be to use alternative energy sources such as energy produced by the sun, or the internal heat of the Earth.

In 1997, nations from around the world gathered at Kyoto, Japan, to discuss plans to reduce greenhouse gases. The result of their meeting was an agreement to cut emissions of carbon dioxide and other greenhouse gases. (**Emissions** are substances discharged into the air.) The agreement, called the Kyoto Protocol, went into effect in 2005.

SUMMARIZE Explain how global warming takes place.

Desertification

KEY QUESTION What causes desertification?

Desertification is the process in which farmland becomes less productive because the land is **degraded**. The land becomes more desert-like, that is, dry and unproductive. Desertification is a serious problem because it turns arid and semiarid areas into nonproductive wasteland. Each year, about 25,000 square miles of land—an area the size of West Virginia—is degraded. This process is happening in many parts of the world, including Africa, China, and the American West.

Causes and Effects In desertification, natural vegetation is removed or destroyed, and soil is exposed to wind. Without shade from the sun, the moisture in the soil evaporates more quickly. The dry top layers of soil particles then blow away. The soil becomes less able to support plant life. The loss of moisture and plants may in itself cause more desertification. But destructive practices in arid and semiarid regions have speeded up the process. Some of these practices are

overgrazing allowing animals to graze so much that plants are unable to grow back

cultivation of marginal land planting crops on fragile soil

deforestation cutting down trees and not replanting new trees

ONLINE PRIMARY SOURCE To read more of Wangari Maathai's writing, go to the Research & Writing Center @ClassZone.com

ANALYZING Primary Sources

Wangari Maathai (born 1940) won the 2004 Nobel Peace Prize for her work fighting deforestation in Africa. To combat desertification, she founded the Green Belt Movement, which has planted 30 million trees across Africa, including her native Kenya.

[The Green Belt Movement] encourages women to create jobs, prevent soil loss, slow the process of desertification and [to] plant and to eat indigenous [local] food crops.

Source: Speech to the 4th United Nations World Women's Conference, Beijing, China, 1995

DOCUMENT-BASED QUESTION

What is the goal of the Green Belt Movement?



Green Belt Movement

The Green Belt Movement, founded by Wangari Maathai in Kenya in 1977, is an example of a program of sustainable development. It started out as a jobs program to pay rural and urban women to plant trees. But it soon became a movement to improve the environment, slow deforestation, and halt desertification.




Solutions There are different solutions to the growing problem of desertification. Each depends on the underlying cause. Some simple solutions are to build sand fences that interrupt the wind, or to use straw mats to reduce evaporation so young plants can take root. Still another is to use solar ovens in place of open fires that require firewood. Planting tree fences and grass belts also reduces the spread of sandy areas. This practice is being used in China and Africa today.

Solutions like the ones above are examples of sustainable practices. **Sustainable** means that these practices use natural resources in such a way as to ensure that they exist for future generations. Sustainable practices work with the environment to protect the land, preserve wildlife, and repair the damage that has

been done to it. The practices allow people to live a better life and ensure that resources will be available both now and in the future.

 **DRAW CONCLUSIONS** Explain what causes desertification.

 **ONLINE QUIZ**
For test practice, go to **Interactive Review** @ ClassZone.com

Section 4 Assessment

TERMS & NAMES

1. Explain the importance of

- global warming
- greenhouse effect
- desertification
- sustainable

USE YOUR READING NOTES

2. Compare and Contrast Use your completed chart to answer the following question:

How does the greenhouse effect contribute to global warming?

GLOBAL WARMING	DESERTIFICATION

KEY IDEAS

3. Why is global warming a problem?
4. What are greenhouse gases?
5. What are three simple solutions to controlling desertification?

CRITICAL THINKING

6. **Evaluate** Which environmental problem, global warming or desertification, is a greater threat to the Earth? Why?
7. **Summarize** How does deforestation cause desertification?
8. **CONNECT to Today** What might happen if more gasoline-powered motor vehicles were used around the world?
9. **MATH Make a Chart** Use the Internet to find information about desertification. Then make a chart that shows locations and the percentage of land that has been degraded.

CHAPTER SUMMARY

Key Idea 1

The Earth is composed of many layers, and its surface continually changes because of the drifting of the continents.

Key Idea 2

Interaction between landforms and bodies of water makes life on Earth possible.

Key Idea 3

The Earth's rotation and revolution influence weather, climate, and living conditions on Earth.

Key Idea 4

Human interference with physical systems causes problems with the environment.

 For Review and Study Notes, go to Interactive Review @ ClassZone.com

NAME GAME

Use the Terms & Names list to complete each sentence on paper or online.

- I am the hot metal center of the Earth.
_____ **core** _____
- I am a naturally formed feature on the Earth's surface. _____
- I fall in the form of rain, snow, sleet, or hail.

- I am an increase in the Earth's temperature.

- I move weathered materials from one place to another. _____
- I am the trapping of the sun's heat by gases in the atmosphere. _____
- I am a large rigid piece of the Earth's crust that is in motion. _____
- I am typical weather conditions over a period of time. _____
- I circulate water between the Earth, oceans, and atmosphere. _____
- I am plants that grow in a region. _____

climate
core
desertification
erosion
global warming
greenhouse effect
hydrologic cycle
landform
magma
precipitation
relief
sediment
tectonic plate
vegetation
weather

Activities

Flip Cards

Use the online flip cards to quiz yourself on terms and names introduced in this chapter.

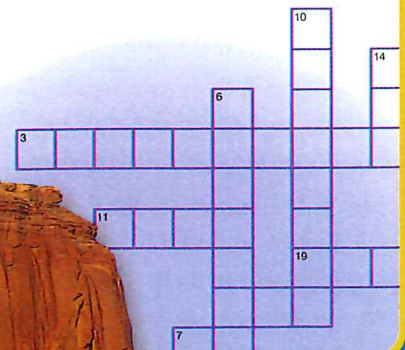


Crossword Puzzle

Complete an online crossword puzzle to test your knowledge of Earth's physical systems.

ACROSS

- a naturally formed feature on the Earth's surface



VOCABULARY

Explain the significance of each of the following.

1. tectonic plate
2. greenhouse effect
3. hydrologic cycle
4. global warming
5. desertification



Explain how the terms and names in each group are related.

6. magma, crust, and continent
7. weathering, erosion, and desertification
8. hydrologic cycle, precipitation, and atmosphere
9. greenhouse gas and global warming
10. vegetation and climate

KEY IDEAS

1 The Earth and Its Forces

11. What is the continental drift theory?
12. What are the four types of tectonic plate movements?
13. How do weathering and erosion reshape the Earth's surface?

2 Bodies of Water and Landforms

14. Why is the Earth sometimes called the "blue planet"?
15. What are the names of the world's five oceans?
16. What two general features do most continents have in common?

3 Climate and Vegetation

17. What are the two motions of the Earth in relation to the sun?
18. What are the four factors that influence climate?
19. What are the basic types of vegetation?

4 Environmental Challenges

20. What happens to the sun's heat in the greenhouse effect?
21. What are two alternative energy sources?
22. What are three areas of the world that have a serious problem with desertification?

CRITICAL THINKING

23. **Analyze Cause and Effect** Create a web diagram to show the effects of global warming. List at least five effects caused by a more intense greenhouse effect.



24. **Summarize** Why are so many earthquakes and volcanoes found near the Ring of Fire?
25. **Draw Conclusions** Why is the surface of the Earth constantly changing?
26. **Connect to Economics** What are the economic costs of earthquakes or volcanoes?
27. **Five Themes: Human-Environment Interaction** What steps have been taken to control global warming?
28. **Connect Geography & Culture** Why might the location and size of landforms affect where people live?

Answer the

ESSENTIAL QUESTION

How do Earth's physical systems make life on Earth possible?

Written Response Write a two- or three-paragraph response to the Essential Question. Be sure to consider the key ideas of each section as well as ways in which the systems interlock. Use the rubric below to guide your thinking.

Response Rubric

A strong response will:

- discuss how the hydrologic cycle makes human occupation of the Earth possible
- describe the causes of weather and climate
- explain how the above systems affect humans

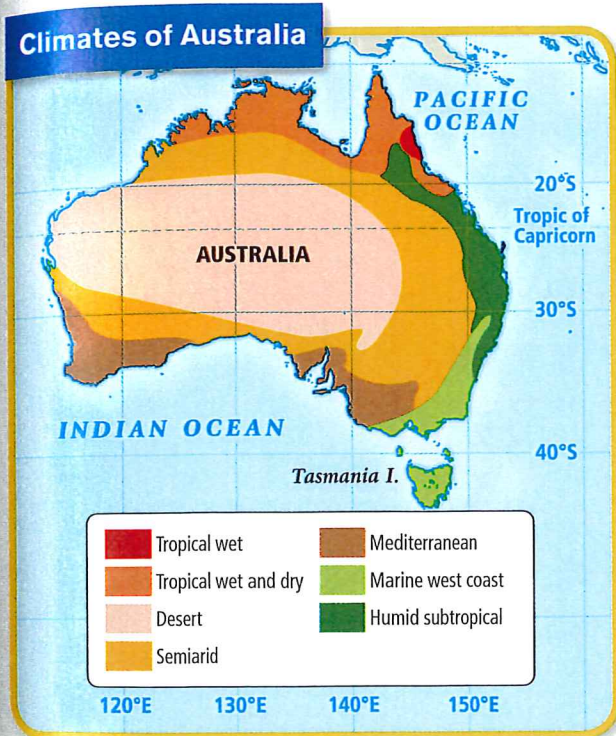
STANDARDS-BASED ASSESSMENT



- Online Test Practice @ ClassZone.com
- Test-Taking Strategies and Practice at the front of this book

THEMATIC MAP

Use the map to answer questions 1 and 2 on your paper.



1. Which climate takes up the largest portion of Australia?

- A. Desert
- B. Mediterranean
- C. Semiarid
- D. Tropical wet and dry

2. In which part of Australia would you find a tropical wet climate?

- A. northwestern
- B. northeastern
- C. southwestern
- D. southeastern

CHART

Study the chart below. Use the information in the chart to answer questions 3 and 4.

Deadliest Earthquakes 1975 to 2005		
Country	Year	Deaths
Indonesia	2004	283,106
China	1976	255,000
Pakistan	2005	80,361
Iran	1990	40,000
Iran	2003	26,200
Armenia	1988	25,000
Guatemala	1976	23,000
India	2001	20,230
Turkey	1999	17,119

Source: USGS Earthquake Hazards Program

3. Which country has experienced the greatest number of deadly earthquakes?

4. In what year did the single most deadly earthquake strike?

GeoActivity

1. INTERDISCIPLINARY ACTIVITY-SCIENCE

Select one of the Earth's major mountain chains and illustrate its creation on a poster. Be sure the poster shows the plates involved, the direction of the collision, and the name of the mountains that were formed.

2. WRITING FOR SOCIAL STUDIES

Review the illustration of the Earth's interior in Section 1. Write a one-paragraph description that would help a younger student understand the layers of the Earth's interior.

3. MENTAL MAPPING

Create an outline map of the world and label the following:

- the seven continents
- the five oceans